Contribution ID: **156** Type: **Poster**

The Channeling Radiation from Positron Bunch in Nanotubes with Polarization Inhomogeneity

Monday, 24 September 2018 18:40 (1 hour)

The problem of channeling radiation of positron bunch in the system of packed nanotubes is investigated. An expression is obtained for the spectral distribution of the total radiation of a positron bunch. The spectral distribution, taking into account the inhomogeneity of the polarization of the medium, differs significantly from the case when the averaged homogeneous polarization of the medium is taken into account. We also note that the spectral distribution depends on the energy of the bunch.

Summary

The problem of channeling radiation of the positron bunch in the system of packed nanotubes is investigated. After discovery of the nanotube [1], the trajectories of channeled positrons were studied in [2].
In the presence of parallel incidence the positrons in the harmonic potential of nanotubes oscillates with some frequency in planes containing the initial points and the axis of nanotubes.
The positron performs a sinusoidal oscillation with the amplitude equal to the radial coordinate of the initial point of entry into the nanotube. The greater the amplitude of the oscillation, the greater the number of channeled positrons. Therefore, the spectral distribution of the total radiation differs from the analogous value for the planar channeling of positrons. The radiation of positrons whose trajectories pass through a cloud of atomic electrons is formed in a medium with inhomogeneous polarization. The dependence of the polarization parameter on the radial coordinate is determined using the Thomas-Fermi statistical method.
We also note that the upper limiting frequency of the radiation depends on the amplitude of the positron oscillation.
An expression is obtained for the spectral distribution of the total radiation of a positron bunch. This distribution consists of two parts. The first part represents the contribution of positrons whose amplitude is less than a certain value, the second part is the contribution of the remaining positrons, the radiation of which is produced in a medium with inhomogeneous polarization. The contribution of the second part disappears in the soft region of the radiation frequencies. The spectral distribution, taking into account the inhomogeneity of the polarization of the medium, differs significantly from the case when the averaged homogeneous polarization of the medium is taken into account.
We also note that the spectral distribution depends on the energy of the bunch.

References

[1] A.Thess et all, Sciense 273 (1996) 483.
[2] L. A. Gevorgyan, K.A. Ispirian, R.K. Ispirian, Pisma Zh. Eksp. Teor. Fiz. 68 (1998) 437; NIM B 145 (1998) 155.

Primary author: Mr GEVORGYAN, Koryun (Yerevan State University (student))

Presenter: Mr GEVORGYAN, Koryun (Yerevan State University (student))

Session Classification: PS1 - Poster session